

RECENT HEALTH PHYSICS R & D PROJECTS AT LLNL.* D.E. Hankins (Lawrence Livermore National Laboratory, 7000 East Avenue, L-379, Livermore, CA 94550)

Four recent projects of the Radiation Safety Discipline Section of the Hazards Control Department are discussed in this paper: (1) A neutron instrument for counting 55 gal plutonium waste drums was developed. The sensitivity of the instrument is higher than can be obtained using gamma counting. This counter allows LLNL to confirm that drums weighing as little as 40 lb do not exceed 100 nCi/g of plutonium. It has made it possible for LLNL to reduce the backlog of legacy waste drums. (2) The criticality alarm system in our plutonium facility was tested by using a 117-Ci Co-60 source. The source was exposed at the far end of the room from the detector heads. The response of the heads was compared to the reading necessary to comply with the ANSI standard criteria for a minimum criticality excursion. The equipment in the rooms provided unexpectedly large amounts of shielding. (3) A highly sensitive neutron instrument was developed to monitor the neutrons from gram quantities of Plutonium used in experiments. The instrument uses an ESP-2 Eberline instrument packet and 4 He-3 tubes that are 2 in. in diameter and 15 in. long inside a polyethylene moderator, which is 2 ft² and 8 in. thick. The instrument has a sensitivity of about 150,000 cpm when exposed to 1 mrem/h of fast neutrons. (4) A study was conducted on how the Panasonic 802 Dosimeter responds to fast neutrons when exposed to nuclear weapon components. The study showed that the dosimeter cannot be used to measure the fast neutron dose to personnel working with the units. The dosimeter primarily responds to the room-scattered thermal neutrons, which is essentially uniform throughout the room.

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